VIVEKANANDA GLOBAL UNIVERSITY
JAIPUR

Synopsis

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1.	**Name of Scholar**	**:**	Vikas Rao Naidu
2.	**Registration number**	**:**	VGU/2015/RES/SCH/CS/0104

3 Title of the Research Investigation:

Interactive multimedia authoring framework for enhanced e-learning solutions in education technology

4 Faculty / Department / Subject:

Computer Science and Engineering / Multimedia

5 Objectives and Scope

a. Background of proposed research area

The proposed area of this research highlights the role of multimedia as a key tool in Education Technology. Many methodologies have been adapted in this area with the help of various audio visual techniques in order to provide various e-learning solutions. Some of them are successful and some are not. This success of such e-learning solutions at various level of studies truly depends on the subject area and content of the module. There are several factors which governs the success of implementation of such e-learning solutions, which eventually depends on the technicality of the authored content. At present, interactive multimedia based content is proven to be more effective compared to other methods, which will be analyzed during the analysis phase of this research.

b. Objectives

* Analysis of existing e-learning tools in education
* Analysis of existing interactive multimedia authoring solutions and their effectiveness
* Defining an effective framework in context of interactive multimedia for e-learning
* Design and development of toolsets to be incorporated in the framework
* Enhanced feedback mechanism using effective and interesting multimedia tools
* Measurement of effectiveness of the framework at various level of subjects.

c. Scope of the stated research

This research will provide an enhanced mechanism which will be easy to implement by any organization for their various e-learning authoring requirements. The organizations will be able to author their own exclusive e-learning solutions such as interactive lessons, educational games, and many more.

The proposed research has a very wide and global scope as every higher educational institution is facing the challenge of effective engagement of classes by various technical means. With the advancement of technologies, it is found to be quite challenging to deliver the class content in an effective way. Hence this proposed research can provide an enhanced framework with easy to implement toolsets, for various disciplines, as the outcome of this research, the class engagement in higher education can be made more effective and engaging resulting in better and enhanced learning environment.

Apart from all these, this research will also be helpful in promoting “paper-less campus” by various enhanced techniques and toolsets of generating e-resources which can minimize the use of hard-copy format of the information.

6 Proposed Methodology

6.1 Exploratory research

Based on perspective of this research, exploratory type of research method would be appropriate to follow. This research work will involve exploration of various tools and techniques to be adopted to produce the expected outcomes. Not only this, but also it will involve exploration of research done in past and the research work being carried out at present in different parts of the World in the field of academics. For this we need to make sure that at every single phase of this research task, the level of knowledge is up to date. The result of exploratory result is not known. Hence even in this research we need to constantly measure the degree of effectiveness with some numerical approach (e.g. Quantitative). [1]

6.2 Applied research

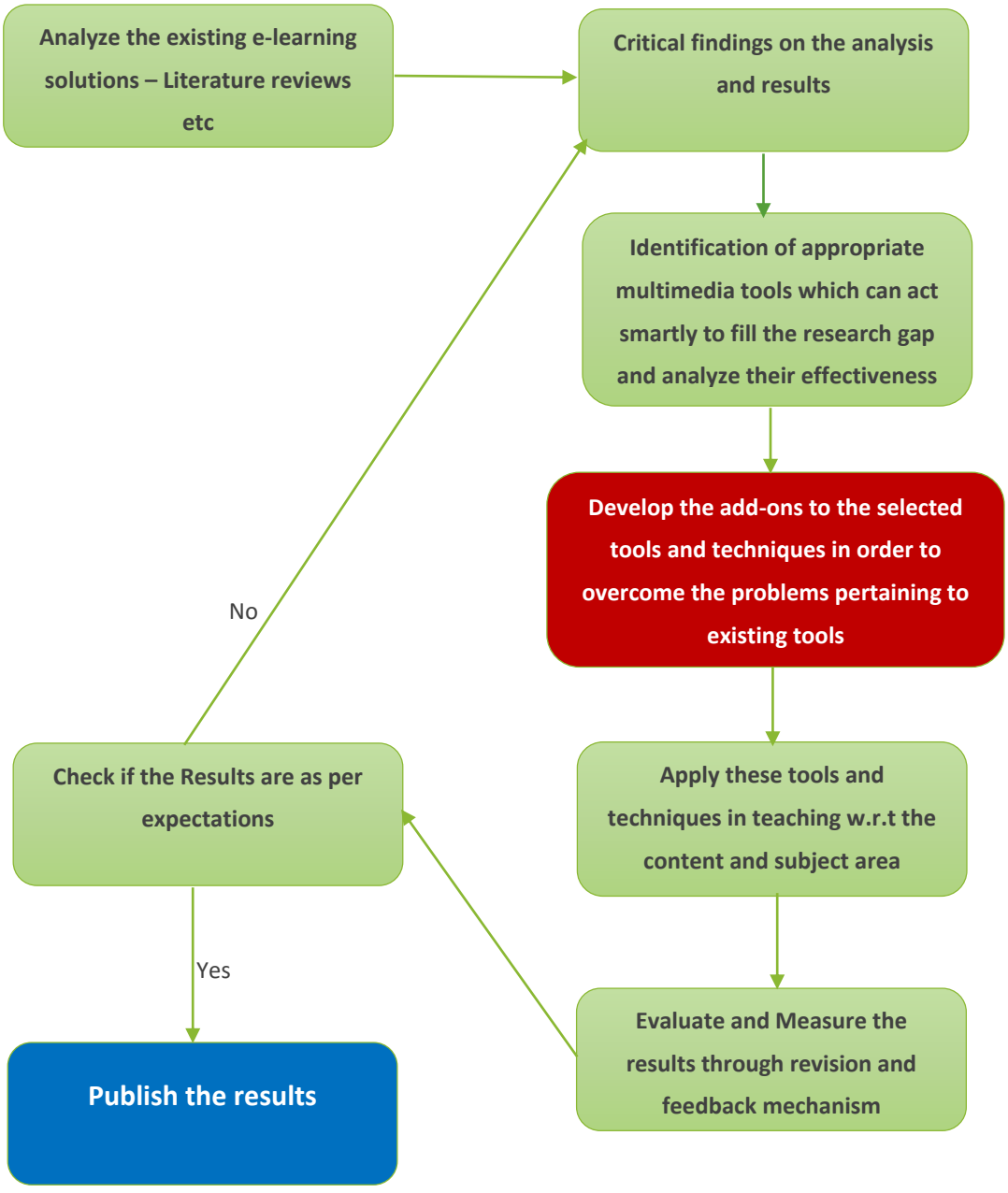
This research involves application of newly acquired knowledge into practice. And the problem statement clearly indicates we are trying to find immediate solution to a problem. Hence we will adapt applied research technique. In this type of research, we need to analyze the research findings and draw some conclusions, based on which we will be able to identify further tools and techniques that are required to carry out entire research process. At regular basis we will be requiring to collect quantitative and qualitative data in order to measure the effectiveness of techniques involved. [1]

6.3 Inquiry based research

Under this category of inquiry based research, we will be adopting Quantitative and Qualitative methods. Quantitative methodology will be measuring various outcomes in numerical form to produce various analytical data as results. We can also generate some graphs from these comparative data in order to draw conclusions with an ease. On the other hand, Qualitative approach will involve measurement of various quality factors of existing system and proposed system. This is very important to draw conclusions for measuring effectiveness of various techniques involved. Both of these techniques could be used by means of various questionnaire, interviews, feedback etc. [1]

6.4 Stages in the Proposed Research

The proposed research process indicates all those steps which will be followed in an organized manner in order to reach the desired results.


Analyze the existing e-learning solutions – Literature reviews etc
Critical findings on the analysis and results
Identification of appropriate multimedia tools which can act smartly to fill the research gap and analyze their effectiveness
Develop the add-ons to the selected tools and techniques in order to overcome the problems pertaining to existing tools
Apply these tools and techniques in teaching w.r.t the content and subject area
Evaluate and Measure the results through revision and feedback mechanism
Check if the Results are as per expectations
No
Yes
Publish the results

As we see from the above diagram the proposed process in this research consists of some most basic and fundamental components. These can be considered as building blocks of this process and it is illustrated above in a very generic manner.

The actual development area will take place in the stage of *Development of the add-ons to the selected tools and techniques in order to overcome the problems pertaining to existing tools*.

6.5 Tools to be used in development stage:

1. Adobe Flash – Action Script 3.0
2. Java Script
3. Adobe Design suite
4. Free and open source tools such as Inkscape, Unity, Android studio etc.
5. JetSim

7 Rationale of Proposed Research Investigation

7.1 Importance of Proposed Research Investigation

Various academic organizations are continuously working on enhancing the quality of their education system. They are applying various tools and techniques into practice in order to enhance teaching and learning experience at campus. But we have observed that, not every technique is effective to serve the purpose. Hence this research aims to improve the quality of education by providing a smart blend of technology with our conventional methods. This is possible by implementation of various interactive multimedia based techniques in order to enhance the learning experience.

7.2 Expected outcome

Expected outcome of this research is an effective framework of interactive multimedia with ***easy-to-implement toolsets*** for class sessions of different nature and content. The effectiveness of this multimedia framework will be measured on different class environment on various higher educational institutions and final conclusion could be drawn that to what extent this research is successful in enhancing teaching and learning experience in higher education.

The proposed research process is expected to play a significance role in enhancing the quality of teaching. Following outcomes are expected with this research at this initial stage:

a. Easy adaptation of multimedia authoring as a part of education technology.
b. Applying the Smart technologies, 'smartly' in enhanced class engagement with effective tool based activities.
c. Measurement of effectiveness of implementation of these new e-learning solutions at various levels.

8 Review of the work related to the field of Research

In order to do literature review, many research papers related to this research area were reviewed and analyzed. The key papers which provided the major breakthrough at this initial stage of research was taken from Elsevier.

The first paper titled "*Results of Enhanced Learning with the Edutainment Format"* and the second paper titled *"The Model for Introduction of Gamification into E-learning in Higher Education.*

As per the first paper, the author is showing the importance of one of the application areas of multimedia, which is edutainment (education + entertainment). It is evident that author has done a good background analysis on the practical implementations of this research area. The author has provided clear idea about various findings in this research area.

The scope of this research is well defined on global level. The Development of Edutainment will study from both printed document and electronic document to analyze the principles relate to education form, which provide the knowledge with entertainment. [2]
The boundaries were:
* Study idea of Edutainment both local and foreign countries.
* Analysis and synthesis the Edutainment Concepts and inquire opinions from specialists of entertainment. It will be a frame to specify the scope, direction and guidance to conform the development.
As we can see from the above scope, which is defined in this research paper, the author is able to make the scope wider on global level but is unable to specify very clearly the actual area of its future development and its impact.

On the other hand, the 2nd research paper presents the model for introduction of gamification into the field of e-learning in higher education. Concepts and differences between techniques and methods of game-mechanics and game dynamics are explained. With proper integration of gamification in the field of e-learning into higher education, a positive impact on the learning process can be achieved, such as higher satisfaction, motivation and greater engagement of students. [3]
The importance of clearly defined objectives, rules, techniques and mechanisms of gamification that affect the dynamics of the students is shown. The paper presents a comprehensive view of the gamification concept in higher education. The advantages and

disadvantages of introducing gamification in e-learning are described. The paper combines the characteristics of gamification with e-learning and shows the possibilities of use in practical.

Scope of this research work is defined well but it is not subject specific. Different subject area might have different requirements. But the authors have tried their best to keep the problem area very specific, but it again speak in general and thus as per this paper, the scope of this research can be defined as open one and can be enlarged to any extent as per the demand of teaching and learning environment and the available platforms.

The efforts by authors are clearly evident regarding various studies of literatures and they have properly quoted in this paper. But the main limitation found in this paper was the implementation part and the formulation of results and various measuring techniques. The results could have increased the impact of this paper as the numerical data and graphical representation generally increases the confidence level of researcher who is going to follow up this work. The result data or graphs helps the researcher to identify specific research gap by studying various measures. Also there is no mention of specific tool which can be called as the most effective one and easy to implement. The authors have mentioned in general, various programming languages, which can be used to apply gamification methodology in teaching and learning process.

9 Research Gaps identified from the literature

The main research gap found from the first literature is the implementation of various techniques into practices. The author has not described exactly what tools will be helpful in order to reach the conclusion. Rather, he has described in general about various ways of teaching and learning styles and which can be brought into practice in order to fill the research gap. Even in the conclusion of this research paper, the author has not clearly specified the exact findings in precise manner. Moreover the future scope part of this research paper is entirely missing and hence leaving it without any clear idea to proceed further.

The research gap from the second paper cannot be drawn so easily. Because though the research problem is very generalized but the main gap from here we can draw is to find some way to implement these suggested methods with least efforts. For any software expert, it is easy to implement but for the faculty members of other specializations, it is difficult to relate their problem by means of games. Hence we must formulate or develop a generalized framework in multimedia to fill this research gap.

10 Chapter wise details of Proposed Research Investigation

Following are the chapter wise details of Proposed Research Investigation – Ph.D Thesis

1 Introduction

In this chapter, we will provide an introduction to the research work

1.1 Background Study

In this section, we will provide an account on background analysis of the research work which also include the study of existing work in this field.

1.1.1 Existing system

It will provide detail on existing system in the similar research area.

1.1.2 Proposed system

This will provide the detail on proposed system, to be developed as a result of this research.

1.2 Rationale of proposed research

This section will provide a detailed rationale of carrying out this research.

1.3 Methodology

This chapter will provide details of various methodologies adopted in order to carry out the research tasks.

2 Literature review

This chapter will provide details on various literature studies in the form of various international publications and journal articles. It will also be used to draw conclusion and define the research gap.

3. Research plan

3.1 Work Breakdown structure

This chapter will provide details on work plan. It will consist of a systematic way of work breakdown structure along with Gantt chart, Network Diagram and Critical Path. This can be generated by means of some project management tools such as MS Project professional.

3.2 Data Collection

This chapter will provide details on various data collection tools along with methods of data collection.

3.3 Analysis

This chapter will provide a detailed analysis on various data collected in previous stage and we will be drawing conclusions based on the various graph generated on output.

3.4 Requirement analysis

This chapter will provide details requirement analysis for carrying out the research which include, but not limited to, various technical and non-technical requirements for carrying out the research tasks.

4 Research design and implementation

This chapter will provide the details on the practical and technical part of the research which is the design phase. The final outcome of this research will be the result of this phase.

4.1 Design of Prototypes

In this section, we will provide the details of all prototypes which are developed for the proposed model of interactive framework and toolsets.

4.2 Adding functionality / coding – Action Script 3.0

The system will become interactive or functional only after associating codes with the design elements. Here, we will be using Action Script 3.0 of Adobe Flash, and Java Script for certain modules.

4.3 Testing

The final system has to be tested at various levels of implementation. This will be done at this stage.

4.4 Implementation

The final implementation of the system will be done at this stage at test-beds. These test-beds can be from our own campus at VGU and also it may be implemented with permission at the organization here at Oman, in order to measure the effectiveness of the results on diverse teaching and learning environment.

5 Results and reflections

This chapter will provide the result of this research work along with critical analysis.

It will also provide a reflection on results in order to find how effective the result of research work is when applied in practice.

6 Conclusion & future enhancement

This chapter will provide a conclusion based on various findings during various phases of this research work. We will also provide details on future enhancement and various scope for improvement in the field of the currently carried out research work.

7 References

List of resources referred during the research process

Appendices

This chapter will provide details of various other elements of research, which also include details related to various publications which are planned during the research phase.

11 Expected duration of the investigation

Expected duration of the investigation and research work is **around three years**. The year wise schedule is provided as follows:

Academic Year	Month	Task	Remarks
2015-2016	May – June 2015	Registration / Presentation on research idea	Completed
	July – Oct 2015	Assignment of Coursework	Completed
	November 2015	Ph.D. Coursework	Completed
	Dec 2015 – Jan 2016	Research plan	Completed and submitted
	Feb 2016 – March 2016	Synopsis preparation	Completed
	April 2016	Synopsis submission	Done
	May – June 2016	Research proposal finalizing	
2016 – 2017	July – Dec 2016	Literature review	Review of various literature and publication of at least one review paper
	January – Feb 2017	Analysis phase	Data Collection Data Analysis
	March – July 2017	Design phase	Publication of one research paper during this phase
2017 – 2018	August 2017	Result	Publication of one more research

			paper based on result
	September – November 2017	Testing, implementation and feedback	Publication of research paper
	December 2017	Analysis of test results	
	Jan – Feb 2018	Incorporating corrections based on test results	
	March – May 2018	Thesis preparation	
	June – July 2018	Presentation / Thesis Defence	

Note : The above stated plan is subject to change based on feedback and suggestions at various phases by the guide and other stakeholders of this research

12 Facilities Availability and Requirement

12.1 Facilities available for the investigation at scholar end

At the end of present workplace, we have all the necessary infrastructure and resources required to carry out the research work. We have a very encouraging management and a dedicated department of Research and Innovation, which constantly supports and motivate towards the research.

All the necessary technical infrastructure is available at present workplace and hence no additional resource other than dedicated schedule for the research is required.

12.2 Facilities required on campus:

At VGU campus, we might require a dedicated lab, with internet and printing facilities, for carrying out research during the visit and during coursework.
Library facilities to be available till late evening during our stay during research work.
Moreover, we might also require the cooperation of various department head in order to carryout various survey during analysis phase of this project, in order to understand diverse learning environment and various challenges.
Apart from these, we will also require to implement this final findings and outcomes of this research work at VGU campus at least in 5 different classes by means of faculty members for any one session, in order to measure the effectiveness of the proposed framework.

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